

WHAT IS CLAIMED IS:

1. A method of modifying a cornea of an eye having a main optical axis, comprising the steps of

aiming a laser at the cornea,

firing the laser at the cornea, the laser separating the internal area of the cornea offset from the main optical axis into first and second internal surfaces to form a corneal flap, a portion of which remains attached to the cornea by an area located at the main optical axis, the first internal surface facing in a posterior direction of the cornea and the second internal surface facing in an anterior direction of the cornea,

lifting the corneal flap,

introducing an ocular implant in between the first and second internal surfaces of the corneal flap, and

placing the corneal flap over the ocular implant to form a new curvature for the exterior surface of the cornea.

2. A method according to claim 1, wherein

the firing step includes firing the laser at the cornea so that the corneal flap is substantially ring-shaped.

3. A method according to claim 1, wherein

the firing step includes firing the laser at the cornea so that the corneal flap is substantially arcuate.

4. A method according to claim 1, wherein

said ocular implant is a corrective lens with at least a portion having a refractive index that is different from that of the cornea.

5. A method according to claim 1, wherein

the introducing step includes introducing an ocular implant that is substantially ring-shaped.

6. A method according to claim 1, wherein

the introducing step includes introducing an ocular implant that is substantially arcuate.

7. A method according to claim 1, wherein

the introducing step includes introducing the ocular implant so that the ocular implant at least partially encircles the main optical axis.

8. A method according to claim 1, wherein

the steps of aiming and firing a laser include aiming and firing an ultrashort pulse laser.

9. A method according to claim 8, wherein

the steps of aiming and firing a laser include aiming and firing a laser selected from a group consisting of a femtosecond laser, a picosecond laser and an attosecond laser.

10. A method according to claim 1, further including the steps of

aiming a second laser at the cornea, and

firing the second laser at an external surface of the cornea to ablate a portion of the external surface of the cornea.

11. A method according to claim 10, wherein

the steps of aiming and firing the second laser at the surface of the cornea to ablate a portion of the external surface of the cornea include aiming and firing the second laser at the portion of the corneal flap that remains attached to the cornea by an area located at the main optical axis.

12. A method according to claim 10, wherein

the step of aiming and firing a second laser at the external surface of the cornea include aiming and firing an excimer laser at the cornea.

13. A method of modifying a cornea of an eye having a main optical axis, comprising the steps of

aiming an ultrashort pulse laser at the cornea,

firing the ultrashort pulse laser at the cornea, the laser separating the internal area of the cornea offset from the main optical axis into first and second substantially ring-shaped internal surfaces to form a corneal flap, a portion of which remains attached to the cornea by an area located at the main optical axis, the first internal surface facing in a posterior direction of the cornea and the second internal surface facing in an anterior direction of the cornea,

lifting the corneal flap,

introducing a substantially ring-shaped ocular implant in between the first and second internal surfaces of the corneal flap so that the ocular implant at least partially encircles the portion of the cornea that remains attached to the cornea by an area located at the main optical axis,

placing the corneal flap over the ocular implant to form a new curvature for the exterior surface of the cornea,

aiming a second laser at the cornea, and

firing the second laser at an external surface of the cornea to ablate a portion of the external surface of the cornea.

14. A method according to claim 13, wherein

the steps of aiming and firing a laser include aiming and firing a laser selected from a group consisting of a femtosecond laser, a picosecond laser and an attosecond laser.

15. A method according to claim 13, wherein

the steps of aiming and firing a second laser at the surface of the cornea to ablate a portion of the external surface of the cornea include firing the laser at the portion of the corneal flap that remains attached to the cornea by an area located at the main optical axis.

16. A method according to claim 13, wherein

the steps of aiming and firing a second laser at the cornea includes aiming and firing an excimer laser at the external surface of the cornea.

17. A system for corrective surgery for a cornea of an eye having a main optical axis, comprising:

an ultrashort pulse laser adapted to separate the internal area of the cornea offset from the main optical axis into first and second internal surfaces to form a corneal flap;

an ocular implant adapted to be inserted in between the first and second internal surfaces of the corneal flap; and

a second laser adapted to ablate a portion of an external surface of the cornea after said ocular implant is inserted in-between the first and second internal surfaces of the corneal flap..

18. A system according to claim 17, wherein

a portion of said flap remains attached to the cornea by an area located at said main optical axis, said first internal surface facing in a posterior direction of said cornea and said second internal surface facing in an anterior direction of said cornea.

19. A system according to claim 18, wherein

said ocular implant is a substantially ring-shaped ocular implant and is adapted to be inserted so that said ocular implant at least partially encircles said portion of the cornea that remains attached to said cornea by an area located at said main optical axis.

20. A system according to claim 19, wherein

said second laser is adapted to ablate the external surface of the cornea at said portion of said corneal flap that remains attached to said cornea by the area located at said main optical axis.

21. A system according to claim 17, wherein

said ultrashort pulse laser is a laser selected from a group consisting of a femtosecond laser, a picosecond laser and an attosecond laser.

22. A system according to claim 17, wherein

said second laser is an excimer laser.

23. A method of modifying a cornea of an eye having a main optical axis, comprising the steps of

separating the internal area of the cornea offset from the main optical axis into first and second substantially ring-shaped internal surfaces to form a corneal flap, a portion of which remains attached to the cornea by an area located at the main optical axis, the first internal surface facing in a posterior direction of the cornea and the second internal surface facing in an anterior direction of the cornea,

lifting the corneal flap,

introducing a substantially ring-shaped ocular implant in between the first and second internal surfaces of the corneal flap so that the ocular implant at least partially encircles the portion of the cornea that remains attached to the cornea by an area located at the main optical axis,

placing the corneal flap over the ocular implant to form a new curvature for the exterior surface of the cornea,

aiming a laser at the cornea, and

firing the laser at an external surface of the cornea to ablate a portion of the external surface of the cornea.

24. A method according to claim 23, wherein

the steps of aiming and firing a laser at the surface of the cornea to ablate a portion of the external surface of the cornea include firing the laser at the portion of the corneal flap that remains attached to the cornea by an area located at the main optical axis.

25. A method according to claim 23, wherein

the steps of aiming and firing a laser at the cornea include aiming and firing an excimer laser at the external surface of the cornea.